

Tour Stops

NRC Assessment Panel
Electronics and Electrical Engineering Laboratory
NIST, Boulder Colorado
February 24, 2005, 10:45-11:45

Quantum Sensors

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The semiconductor industry and other nanodevice industries have an important unmet need for tools to analyze the chemical composition of nanoscale defects and structures. The Quantum Sensors Project develops sensors based on quantum phenomena for applications including the analysis of nanostructures. At this tour stop, we will discuss the development at NIST of single-photon x-ray microcalorimeter systems with energy resolution 50-100 times better than conventional technologies. For the first time, these systems allow the non-destructive identification of the chemical composition of many nanoparticles in a scanning-electron microscope with size less than 100 nm. The development of large arrays of microcalorimeter sensors will allow their use as an on-line tool on the factory floor. These devices also have many astronomical applications.

Electromagnetic Shielding

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The aviation, defense and aerospace communities have a critical need to understand and characterize the impact of radio signals on aircraft and space vehicles. Accurate characterization is needed both to address flight safety concerns (e.g. could radio signals interfere with vital avionics systems?), and to ensure the immunity of on-board systems to high-power electromagnetic weapons (e.g. could such a weapon be used to knock out an airborne early-warning radar system?). At this tour stop, the Time-Domain Fields Project will present some key measurement and simulation results from a project sponsored by the FAA, which are being used to help the aviation community better understand airframe shielding measurements and to accurately analyze data obtained. We will conclude the talk by discussing our upcoming NASA space shuttle shielding evaluation effort, one of the key steps in the Shuttle's return to flight.